

What is claimed is:

1. A predistortion type distortion compensation apparatus for compensating distortion occurring in an amplifier for amplifying an input signal, comprising:

distortion generating means for generating distortion in an input signal,

input signal level detecting means for detecting the level of the input signal,

distortion control means for controlling the distortion generated by the distortion generating means by using a control value corresponding to the level of the input signal detected by the input signal level detecting means,

distortion component level detecting means for detecting the level of distortion component contained in the amplified signal issued from the amplifier,

integrating means for integrating the level of the distortion component detected by the distortion component detecting means in every level of the input signal detected by the input signal level detecting means, and

control value updating means for updating the control value corresponding to the level used by the distortion control means so that the integration result of every level of input signal obtained from the integrating means may be small.

2. A predistortion type distortion compensation apparatus for compensating distortion occurring in an amplifier for amplifying an input signal, comprising:

distortion generating means for generating distortion in an input signal,

input signal level detecting means for detecting the level of the input signal,

distortion control means for controlling the distortion generated by the distortion generating means by using a control value corresponding to the level of the input signal detected by the input signal level detecting means,

distortion component level detecting means for detecting the level of distortion component contained in the amplified signal issued from the amplifier,

counting means for counting inputs at specified level of the level of input signal detected by the input signal level detecting means,

integrating means for integrating the level of the distortion component detected by the distortion component detecting means when the level of the input signal detected by the input signal level detecting means is the specified level for the period until a specified value is counted by the counting means, and

control value updating means for updating the control value corresponding to the specified level used by the distortion control means so that the integration result of the integrating means may be small.

3. A predistortion type distortion compensation apparatus according to claim 1, wherein the distortion control means is composed by using a memory for storing the level of

input signal and control value in correspondence to each other.

4. A predistortion type distortion compensation apparatus according to claim 2, wherein the distortion control means is composed by using a memory for storing the level of input signal and control value in correspondence to each other.

5. A CDMA radio base station apparatus for compensating the distortion occurring in an amplifier for amplifying a transmission signal by a predistortion type distortion compensation apparatus, said predistortion type distortion compensation apparatus comprising:

distortion generating means for generating distortion in an input signal, input signal level detecting means for detecting the level of the input signal, distortion control means for controlling the distortion generated by the distortion generating means by using a control value corresponding to the level of the input signal detected by the input signal level detecting means, distortion component level detecting means for detecting the level of distortion component contained in the amplified signal issued from the amplifier, integrating means for integrating the level of the distortion component detected by the distortion component detecting means in every level of the input signal detected by the input signal level detecting means, and control value updating means for updating the control value corresponding to the level used by the distortion control means so that the integration result of every level of input signal obtained from the integrating means may be small.

6. A CDMA radio base station apparatus for compensating the distortion occurring in an amplifier for amplifying a transmission signal by a predistortion type distortion compensation apparatus, said predistortion type distortion compensation apparatus comprising:

distortion generating means for generating distortion in an input signal, input signal level detecting means for detecting the level of the input signal, distortion control means for controlling the distortion generated by the distortion generating means by using a control value corresponding to the level of the input signal detected by the input signal level detecting means, distortion component level detecting means for detecting the level of distortion component contained in the amplified signal issued from the amplifier, counting means for counting inputs at specified level of the level of input signal detected by the input signal level detecting means, integrating means for integrating the level of the distortion component detected by the distortion component detecting means when the level of the input signal detected by the input signal level detecting means is the specified level for the period until a specified value is counted by the counting means, and control value updating means for updating the control value corresponding to the specified level used by the distortion control means so that the integration result of the integrating means may be small.

7. A CDMA radio base station apparatus according to claim 5, wherein the distortion control means of the predistortion

type distortion compensation apparatus is composed by using a memory for storing the level of input signal and control value in correspondence to each other.

8. A CDMA radio base station apparatus according to claim 6, wherein the distortion control means of the predistortion type distortion compensation apparatus is composed by using a memory for storing the level of input signal and control value in correspondence to each other.

9. A CDMA radio repeater amplifying apparatus for compensating the distortion occurring in an amplifier for amplifying a transmission signal by a predistortion type distortion compensation apparatus, said predistortion type distortion compensation apparatus comprising:

distortion generating means for generating distortion in an input signal, input signal level detecting means for detecting the level of the input signal, distortion control means for controlling the distortion generated by the distortion generating means by using a control value corresponding to the level of the input signal detected by the input signal level detecting means, distortion component level detecting means for detecting the level of distortion component contained in the amplified signal issued from the amplifier, integrating means for integrating the level of the distortion component detected by the distortion component detecting means in every level of the input signal detected by the input signal level detecting means, and control value updating means for updating the control value corresponding to the level used by

the distortion control means so that the integration result of every level of input signal obtained from the integrating means may be small.

10. A CDMA radio repeater amplifying apparatus for compensating the distortion occurring in an amplifier for amplifying a transmission signal by a predistortion type distortion compensation apparatus, said predistortion type distortion compensation apparatus comprising:

distortion generating means for generating distortion in an input signal, input signal level detecting means for detecting the level of the input signal, distortion control means for controlling the distortion generated by the distortion generating means by using a control value corresponding to the level of the input signal detected by the input signal level detecting means, distortion component level detecting means for detecting the level of distortion component contained in the amplified signal issued from the amplifier, counting means for counting inputs at specified level of the level of input signal detected by the input signal level detecting means, integrating means for integrating the level of the distortion component detected by the distortion component detecting means when the level of the input signal detected by the input signal level detecting means is the specified level for the period until a specified value is counted by the counting means, and control value updating means for updating the control value corresponding to the specified level used by the distortion control means so that the

integration result of the integrating means may be small.

11. A CDMA radio repeater amplifying apparatus according to claim 9, wherein the distortion control means of the predistortion type distortion compensation apparatus is composed by using a memory for storing the level of input signal and control value in correspondence to each other.

12. A CDMA radio repeater amplifying apparatus according to claim 10, wherein the distortion control means of the predistortion type distortion compensation apparatus is composed by using a memory for storing the level of input signal and control value in correspondence to each other.

13. A predistortion type distortion compensation apparatus according to claim 1,

wherein the distortion generating means comprises a predistortion unit including a variable attenuator and a variable phase shifter, the input signal level detecting means comprises an envelope detector, the distortion control means comprises a compensation table including an ATT table and a phase shifter table, the amplifier comprises a power amplifier, the distortion component level detector comprises a side band power measuring unit, the integrating means comprises a quantizing circuit, a first selection circuit, and plural integrating circuits, and the control value updating means comprises a control circuit and a second selection circuit,

the input signal coming in from an input end of the predistortion type distortion compensation apparatus is divided into two signals, and the amplitude of one distribution

signal is compensated of distortion by the variable attenuator in the predistortion unit according to the control from the ATT table of the compensation table, the phase of this distribution signal is compensated of distortion by the variable phase shifter in the predistortion unit according to the control from the phase shifter table of the compensation table, and this distribution signal of which amplitude and phase are compensated of distortion is amplified by the power amplifier, and issued from an output end of the predistortion type distortion compensation apparatus,

the envelope information of the other distribution signal is detected by the envelope detector, the control value for amplitude control corresponding to this detection result is read out by referring to the ATT table of the compensation table and issued to a control terminal of the variable attenuator of the predistortion unit, and the control value for phase shift control corresponding to the detection result is read out by referring to the phase shifter table of the compensation table, and is issued to a control terminal of the variable phase shifter of the predistortion unit, and

adjacent channel leak power contained in part of the amplified signal issued from the power amplifier is measured by the side band power measuring unit, the detection result of the envelope detector is converted into a digital value by the quantizing circuit, one integrating circuit is selected and changed over out of plural integrating circuits as the output destination of the adjacent channel leak power issued from the



side band power measuring unit by the first selection circuit depending on the digital value entered from the quantizing circuit, the adjacent channel leak power issued from the first selection circuit is integrated by each integrating circuit, one integrating circuit is selected from these plural integrating circuits by the second selection circuit according to control from the control circuit, and control values to be stored in the ATT table and phase shifter table of the compensation table are updated by the control circuit according to the integration result obtained from the selected integrating circuit.

14. A predistortion type distortion compensation apparatus according to claim 2,

wherein the distortion generating means comprises a predistortion unit including a variable attenuator and a variable phase shifter, the input signal level detecting means comprises an envelope detector, the distortion control means comprises a compensation table including an ATT table and a phase shifter table, the amplifier comprises a power amplifier, the distortion component level detector comprises a side band power measuring unit, the counting means comprises a quantizing circuit, comparator and a counter, the integrating means comprises a changeover circuit and integrating circuit, and the control value updating means comprises a control circuit,

the input signal coming in from an input end of the predistortion type distortion compensation apparatus is divided into two signals, and the amplitude of one distribution

signal is compensated of distortion by the variable attenuator in the predistortion unit according to the control from the ATT table of the compensation table, the phase of this distribution signal is compensated of distortion by the variable phase shifter in the predistortion unit according to the control from the phase shifter table of the compensation table, and this distribution signal of which amplitude and phase are compensated of distortion is amplified by the power amplifier, and issued from an output end of the predistortion type distortion compensation apparatus,

the envelope information of the other distribution signal is detected by the envelope detector, the control value for amplitude control corresponding to this detection result is read out by referring to the ATT table of the compensation table and issued to a control terminal of the variable attenuator of the predistortion unit, and the control value for phase shift control corresponding to the detection result is read out by referring to the phase shifter table of the compensation table, and is issued to a control terminal of the variable phase shifter of the predistortion unit, and

adjacent channel leak power contained in part of the amplified signal issued from the power amplifier is measured by the side band power measuring unit, the detection result of the envelope detector is converted into a digital value by the quantizing circuit, a specified ON signal is issued to the control terminal of the changeover circuit and counter from the comparator when the level of the input signal corresponding to

this digital value is included in a level range on the basis of the threshold information from the control circuit, the count value is increased by the counter every time the ON signal is entered in the counter from the comparator, the adjacent channel leak power issued from the side band power measuring unit is issued to the integrating circuit by the changeover circuit when the ON signal is entered in the changeover circuit from the comparator, the adjacent channel leak power is integrated by the integrating circuit, and control values to be stored in the ATT table and phase shifter table of the compensation table are updated by the control circuit according to the integration result.